Tree Survey – Forrest Road Widening, Armadale

Prepared for

City of Armadale

Zana Sheary and Sarah Taylor

Arboricultural Consultants

Paperbark Technologies Pty Ltd

ISA Certified Arborist - AU0039A

Quantified Tree Risk Assessor, Licensed user 1082 & 4098

Diploma of Horticulture/Arboriculture

PO Box 1116

Scarborough WA 6922

Mobile: 0401 817 551

www.paperbarktechnologies.com.au

zana@paperbarktechnologies.com.au

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BRIEF:

This consultant has been commissioned by the City of Armadale to inspect and submit a report in respect of 150 trees located adjacent to a section of Forrest Road, Armadale which is scheduled to undergo construction works.

The section of Forrest Road is scheduled to undergo an upgrade which includes widening of the road and implementing a new roundabout adjacent to the Eighth Road intersection. The purpose of the survey is to assess each tree located alongside the section of Forrest Road and recommend if trees can be retained and advise of any remedial works taking into account the developmental process, future land use and increased targets.

The survey scope requires:

- Tagging each tree with a numerical tree tag from 1 – 151.
- The identification of tree species
- Measurement of the height & canopy spread of the trees
- Measurement of trunk diameters
- A description of the trees current health and structural condition
- Advice regarding the suitability for retention and if not why not.
- Tree Protection Zone Radius (TPZ)
- Structural Root Zone Radius (SRZ)
- Recommended remedial pruning or other works that may be required to allow for demolition, safety, machinery movements and future vehicle height clearances.

A total of 150 trees located within the site have been inspected, assessed and photographed for this report.

Trees were tagged to facilitate locating individual trees and numbers have been placed upon site plans provided by City of Armadale.

A photo of each tree is also included in this report.

This consultant confirms tree inspections were carried out on the 19th and 20th of August 2019.

FORM AND APPROACH:

Below are the definitions for the captured information provided:

Botanical name Information:

Botanical names are listed detailing the generic name followed by the specific epithet. The variety is named where applicable. Only the scientific and botanical names should be accepted to identify an exact tree species.

The botanical name is predominantly used within this report and the common name provided for your reference within the summary.

Tree Age:

Tree age is based on the age of the tree that would be considered typical for the species in the general area. It is not based on the health of the tree.

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Young
The tree has recently been planted or self-sown (within the last 3 – 5 years).

Semi mature
The tree has become established in the site and may be approaching its expected mature size. If correctly maintained the specimen will continue to grow to maturity.

Mature
Usually the tree will have reached the expected size for the species in the site.

Post mature
The tree has passed the mature stage of its life and is characterized by both a very slow growth rate and by intolerance to disturbances. The post-mature tree has limited energy reserves to fight invading diseases and insects, especially pruning wounds. Removal of live tissue is something to avoid.

Severe decline
The tree is in its final stages of life, the tree is beginning to lose its ability to defend itself. It is at this stage that the tree becomes susceptible to pests and disease. The tree will be assessed for hazards and may require reduction pruning or removal.

Note
It is important to note that tree age is not directly related to tree health. For example: It is possible for a young tree to have very poor health and a mature tree to have good health.

Tree health:

Good
The tree is demonstrating good or exceptional growth for the species. The tree should exhibit a full canopy of foliage and have only minor pest or diseases problems. Foliage colour, size and density should be typical of a healthy specimen of that species.

Fair
The tree is in reasonable condition and growing well for the species. The tree should exhibit an adequate canopy of foliage. There may be some dead wood present in the crown, some grazing by insects or animals may be evident and/or foliage colour, size or density may be atypical for a healthy specimen of that species.

Poor
The tree is not growing to its full capacity; extension growth of the laterals may be minimal. The canopy may be thinning or sparse. Large amounts of dead wood may be evident throughout the crown. Significant pest and disease problems may be evident or symptoms of stress indicating tree decline.

Very poor
The tree appears to be in a state of decline and the canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy or pest and disease problems may be causing a severe decline in tree health.

Dead
The tree is dead.

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Tree Structure:

Each tree surveyed was examined in detail to ascertain its overall structural condition and then placed into one of five categories:

Good: The tree has a well-defined and balanced crown. Branch unions appear to be strong, with no defects evident in the trunk or the branches. Major limbs are well defined. The tree would be considered a good example of the species. Probability of significant failure is highly unlikely.

Fair: The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance, and some branch unions or branches may be exhibiting minor structural faults. If the tree is single trunked, this may be on a slight lean or be exhibiting minor defects. Probability of significant failure is low.

Poor: The tree may have a poorly structured crown. The crown may be unbalanced or exhibit large gaps. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. The tree may have suffered major root damage. Probability of significant failure is moderate.

Very Poor: The tree has a poorly structured crown. The crown is unbalanced or exhibits large gaps. Major limbs are not well defined. Branch unions may be poor or faulty at the point of attachment. A section of the tree has failed or is in imminent danger of failure. Active failure may be present or failure is probable in the immediate future.

Has Failed: A significant section of the tree or the whole tree has failed.

TPZ – Tree Protection zone

As per the Australian Standards AS 4970-2009 *Protection of trees on development sites* the tree protection zone (TPZ) is the principal means of protecting trees on sites where development is to occur. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The radius of the TPZ is calculated for each tree by multiplying its DBH x 12.
E.g. DBH is 0.5m x 12 = 6m radius (TPZ = 6m measured from the centre of the trunk at ground level.)

If the proposed encroachment is greater than 10% into the TPZ or SRZ the project Arborist must demonstrate that the tree(s) would remain viable. Once proposed changes or designs of the site are completed the project Arborist may need to re-inspect selected trees to ensure the trees are adequately protected. The purpose of this is to determine the potential impact on trees proposed to be retained.

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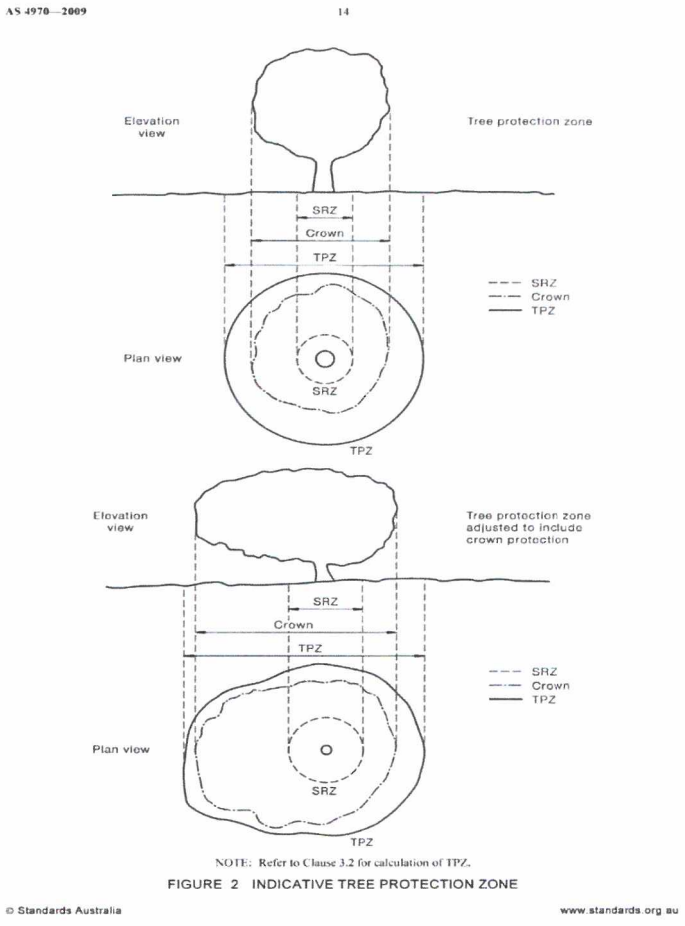

Figure 1 Indicative tree protection zone from AS 4970-2009

SRZ – Structural Root Zone

This consultant advises that a structural root zone area of a tree is required for tree stability. Using Australian Standards AS 4970-2009 *Protection of trees on development sites* the structural root zone area can be calculated when major encroachment into a TPZ is proposed. This zone considers a tree's structural stability only and not the root zone required for a tree's health and long-term viability, which is usually a much larger area. (As cited by AS 4970-2009) An indicative SRZ radius can be determined from the trunk diameter measured immediately above the buttress using the following formula. SRZ radius = $(D \times 50)_{0.42} \times 0.64$ or using the following guide from AS 4970-2009. E.g. Diameter at root flare is 0.8m (red circle) and using the graph below a 3m SRZ radius is required. This is measured from the centre of the trunk at ground level.

All trunk diameters used in TPZ and SRZ calculations were measured directly.

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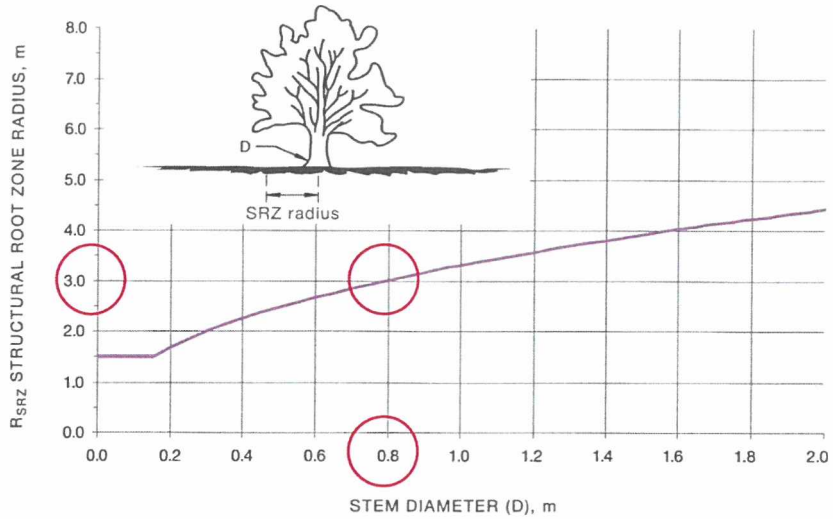

The curve can be expressed by the following formula:
$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$

NOTES:

1 R_{SRZ} is the calculated structural root zone radius (SRZ radius).
2 D is the stem diameter measured immediately above root buttress.
3 The R_{SRZ} for trees less than 0.15 m diameter is 1.5 m.
4 The R_{SRZ} formula and graph do not apply to palms, other monocots, cycads and tree ferns.
5 This does not apply to trees with an asymmetrical root plate.

Figure 2 Displays the Structural Root Zone Calculation from AS 4970-2009 *Protection of trees on development sites* and indicates how to work out the SRZ of each tree.

Tree Survey Details over leaf.

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Tree Survey – Forrest Road, Armadale

Tree no.	Botanical name	Height (m)	Canopy spread (m)	DBH (mm)	DRF (mm)	Health & Condition	Recommendations	Suitable to Retain Yes/No	TPZ (m) radius	SRZ (m) radius
1	*Eucalyptus botryoides*	23.8	19.5	1410	1410	Good health and fair structure displaying a satisfactory coverage of foliage. Secondary stem appears soundly attached at this time. Previous limb failure evident. Hanging failed limb remains wedged within the canopy. Low north facing branch will impact the proposed work. Evidence of work within the SRZ to install boundary fence for the school.	Retrieve hanging branch and remove north-east facing limb back to sound growth points.	Yes	15	3.82
2	*Eucalyptus botryoides*	24.8	15.5	1300	1300	Good health and poor structure displaying a satisfactory coverage of foliage supported by multiple stems. Major deadwood and epicormic growth evident throughout the canopy with some considered a size and weight to represent a hazard. Evidence of work within the SRZ to install boundary fence for the school.	Remove major deadwood. Selectively remove the number of limbs held over the proposed road.	Yes	15	3.69
3	*Eucalyptus botryoides*	28.2	9	750	920	Good health and fair structure displaying a satisfactory coverage of foliage. Previous limb failures. Evident of work within the SRZ to install boundary fence.	Cleanly pruned failed branch stub.	Yes	9	3.2

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4	*Eucalyptus botryoides*	27.1	14.5	1150	1150	Good health and fair structure displaying a satisfactory coverage of foliage supported by codominant stems. Codominant union appears sound at this time Previous limb failure and epicormic growth evident throughout the canopy. Evidence of work within the SRZ to install boundary fence.	Selectively remove the number of limbs held over the proposed road.	Yes	13.8	3.51
5	*Eucalyptus botryoides*	19.2	11	1120	1120	Good health and fair structure displaying a satisfactory coverage of foliage supported by codominant stems. Codominant union appears sound at this time Previous limb failure and epicormic growth evident throughout the canopy. Evident of work within the SRZ to install boundary fence.	Selectively remove the number of limbs held over the proposed road.	Yes	13.44	3.47
6	*Eucalyptus camaldulensis*	19.3	7	370	440	Good health and fair structure. Suppressed canopy due to close proximity to the neighbouring tree. Epicormic growth development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.44	2.34

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7	*Corymbia calophylla*	11	5	210	260	Good health and good structure displaying a satisfactory coverage of foliage.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.52	1.88
8	*Eucalyptus botryoides*	25.8	9	680	820	Good health and fair structure displaying a satisfactory coverage of foliage. Previous limb failure and epicormic growth evident throughout the canopy. Evidence of work within the SRZ to install boundary fence for the school.	Selectively remove the number of limbs held over the proposed road.	Yes	8.16	3.04
9	*Eucalyptus botryoides*	25.5	9.5	760	890	Good health and fair structure displaying a satisfactory coverage of foliage. Previous limb failure and epicormic growth evident throughout the canopy. Displays symptoms of Eucalyptus canker. Evidence of work within the SRZ to install boundary fence for the school.	Selectively remove the number of limbs held over the proposed road.	Yes	9.12	3.15
10	*Eucalyptus botryoides*	26	8.5	530	730	Good health and fair structure displaying a satisfactory coverage of foliage. Previous limb failure and epicormic growth evident throughout the canopy. Evidence of work within the SRZ to install boundary fence for the school.	Selectively remove the number of limbs held over the proposed road.	Yes	6.36	2.9

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11	*Eucalyptus botryoides*	8.5	3.5	160	240	Self-sown tree found in good health and condition. Foliage displays recent Psyllid infestation. Suppressed due to the close proximity of the neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2	1.82
12	*Eucalyptus botryoides*	26.1	13.5	690	940	Good health and fair structure. Displays a satisfactory coverage of foliage. Canopy displays a recent infestation of Psyllid. Surface roots display damage within the SRZ due to the installation of the adjacent boundary fence.	Selectively remove the number of limbs held over the proposed road.	Yes	8.28	3.22
13	*Eucalyptus botryoides*	31.6	14.5	710	980	Good health and fair structural condition displaying a satisfactory cover of foliage. Codominant union appears sound at this time. Previous limb failure evident. Surface roots display damage within the SRZ due to the installation of the adjacent boundary fence.	No works required at this time.	Yes	8.52	3.28
14	*Eucalyptus botryoides*	24.8	15	1310	1310	Good health and poor structure displaying a satisfactory coverage of foliage supported by multiple stems. Major deadwood and epicormic growth evident throughout the canopy. Multiple previous limb failures with branch stubs remaining.	Remove tree due to history of limb failure and poor structural condition.	Not suitable to retain due to poor structural condition.	15	3.71

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15	*Eucalyptus botryoides*	21.3	11.5	770	960	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time. Previous limb failure evident. Surface roots display damage within the SRZ due to the installation of the adjacent boundary fence.	Selectively remove the number of limbs held over the proposed road.	Yes	9.24	3.25
16	*Eucalyptus botryoides*	24	11	1020	1020	Good health and poor structural condition displaying a satisfactory cover of foliage. Significantly included multiple stems appear sound at this time. Major branch forks appear sound at this time. Previous limb failure evident. Surface roots display damage within the SRZ due to the installation of the adjacent boundary fence.	Selectively remove the number of limbs held over the proposed road.	Yes	12.24	3.34
17	*Eucalyptus botryoides*	21.2	15.8	1450	1450	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time. Previous limb failure evident. Included union appears sound at this time. Epicormic growth and evidence of psyllid infestation. Surface roots display damage within the SRZ due to the installation of the adjacent boundary fence.	Selectively remove the number of limbs held over the proposed road.	Yes	15	3.87

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18	*Eucalyptus botryoides*	20.5	7.5	660	800	Fair health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time. Previous limb failure evident. Included union appears sound at this time. Epicormic growth and evidence of psyllid infestation.	Selectively remove the number of limbs held over the proposed road.	Yes	7.92	3.01
19	*Eucalyptus botryoides*	21.5	11	1850	1850	Fair health and poor structural condition displaying a satisfactory cover of foliage. Canopy displays an infestation of psyllid. Crossed and conflicting limbs appear poorly attached. Multiple previous limb failure. Deadwood held throughout. Evidence of Eucalyptus canker.	Remove tree due to history of limb failure and poor structural condition.	Not suitable to retain due to poor structural condition.	15	4.29
20	*Eucalyptus botryoides*	21.5	13.5	790	1050	Good health and fair structure. Previous limb failure. Epicormic growth with evidence of Psyllid infestation. Minor deadwood held throughout. Major branch forks appear sound at this time.	Selectively remove the number of limbs held over the proposed road.	Yes	9.48	3.38
21	*Eucalyptus botryoides*	21.5	11	910	910	Good health and fair structure. Secondary stem appears soundly attached at this time. Previous limb failure. Epicormic growth with evidence of Psyllid infestation. Minor deadwood held throughout. Major branch forks appear sound.	Selectively remove the number of limbs held over the proposed road.	Yes	10.92	3.18

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22	*Eucalyptus camaldulensis*	23.2	14	580	670	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time. Previous limb failure evident. Included union appears sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.96	2.8
23	*Eucalyptus camaldulensis*	18	7	410	470	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.92	2.41
24	*Eucalyptus camaldulensis*	22.4	16	700	810	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time. Previous codominant failure evident.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	8.4	3.03
25	*Eucalyptus camaldulensis*	18.9	10	570	690	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.84	2.83

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26	*Eucalyptus camaldulensis*	18.9	13	470	570	Good health and fair structural condition displaying a satisfactory cover of foliage. Major branch forks appear sound at this time. Phototrophic lean with canopy suppressed due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.64	2.61
27	*Eucalyptus camaldulensis*	18.9	11	990	990	Good health and fair structural condition displaying a satisfactory cover of foliage supported by twin stem. Major branch forks appear sound at this time. Phototrophic lean with canopy suppressed due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	11.88	3.3
28	*Eucalyptus camaldulensis*	20.1	11	420	570	Good health and fair structural condition displaying a satisfactory cover of foliage supported by twin stem. Major branch forks appear sound at this time. Sporadically held deadwood. Phototrophic lean with canopy suppressed due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.04	2.61
29	*Eucalyptus camaldulensis*	10	3	230	300	Poor health and structural condition. Apical leader has failed. Canopy consist of epicormic growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	2

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30	*Eucalyptus camaldulensis*	15.7	6	470	600	Good health and fair structure displaying a satisfactory coverage of foliage. Secondary stem. Previous limb failure. Minor deadwood held throughout.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.64	2.67
31	*Eucalyptus camaldulensis*	22.4	20	1640	1640	Good health and fair structure displaying a satisfactory coverage of foliage supported by multiple stems. Evidence of previous limb failures and minor deadwood held throughout.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	4.07
32	*Eucalyptus camaldulensis*	20.3	10	580	620	Good health and fair structure displaying a satisfactory coverage of foliage supported by codominant stems. Evidence of previous limb failures and minor deadwood held throughout. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.96	2.71
33	*Eucalyptus camaldulensis*	18.5	8	370	490	Good health and fair structure displaying a satisfactory coverage of foliage. Evidence of previous limb failures and epicormic growth held throughout. Phototrophic lean due to the close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.44	2.45

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34	*Eucalyptus camaldulensis*	18.5	7	480	630	Good health and fair structure displaying a satisfactory coverage of foliage supported by codominant stem. Evidence of previous limb failures and epicormic growth held throughout. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.76	2.73
35	*Eucalyptus camaldulensis*	19.4	14	970	970	Good health and poor structure displaying a satisfactory coverage of foliage supported by multiple crown leaders. Evidence of multiple included unions and previous limb failures throughout. Pest infestation.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	11.64	3.27
36	*Eucalyptus camaldulensis*	19.5	8	460	560	Good health and poor structure displaying a satisfactory coverage of foliage supported by codominant stems. Evidence of previous limb failures and epicormic growth held throughout. Basal suckers. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.52	2.59
37	*Eucalyptus camaldulensis*	13.5	4	330	350	Fair health and poor structure displaying a satisfactory coverage of foliage. Evidence of previous major limb removal and epicormic growth held throughout. Phototrophic lean and suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.96	2.13

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38	*Eucalyptus camaldulensis*	11.5	11	340	360	Good health and poor structure displaying a satisfactory coverage of foliage supported by codominant stems. Evidence of previous limb failures and epicormic growth held throughout. Suckers developing. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.08	2.15
39	*Eucalyptus camaldulensis*	11.9	7	300	350	Good health and poor structure displaying a satisfactory coverage of foliage. Evidence of previous limb failures and epicormic growth throughout. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.6	2.13
40	*Eucalyptus camaldulensis*	11.9	7	400	450	Good health and poor structure displaying a satisfactory coverage of foliage. Evidence of previous limb failures and epicormic growth throughout. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.8	2.37
41	*Eucalyptus camaldulensis*	25.9	13	720	1150	Good health and fair structure displaying a satisfactory coverage of foliage supported by codominant stem. Evidence of previous limb failures and minor deadwood held throughout.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	8.64	3.51

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42	*Eucalyptus camaldulensis*	8.6	7	250	330	Good health and condition displaying a satisfactory coverage of foliage. Canopy is suppressed and contains predominantly epicormic growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3	2.08
43	*Eucalyptus camaldulensis*	18.7	4.5	190	290	Good health and fair structural condition. Limited lateral limb development. Major branch forks appear sound. Secondary stem.	Remove secondary stem.	Yes	2.28	1.97
44	*Eucalyptus camaldulensis*	6.2	5.5	370	500	Good health and poor structure. Apical limb failure with epicormic growth development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.44	2.47
45	*Eucalyptus camaldulensis*	27.6	10.5	1250	1250	Good health and poor structure. Included limbs appear sound at this time. Previous major limb failure. Major deadwood is considered a hazard.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	3.63
46	*Eucalyptus camaldulensis*	18.8	12	360	460	Fair health and poor structure. Phototrophic lean. Previous major limb failure. Epicormic growth and deadwood throughout.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.32	2.39

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47	*Eucalyptus camaldulensis*	18	8.5	360	430	Poor health and fair structure. Epicormic growth and deadwood throughout. Codominant union appears sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.32	2.32
48	*Eucalyptus camaldulensis*	18.8	4	260	350	Fair health and fair structural condition. Limited lateral limb development. Major branch forks appear sound.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.12	2.13
49	*Eucalyptus camaldulensis*	4	6	240	290	Good health and poor structural condition displaying a satisfactory cover of foliage. Phototrophic lean. Major branch forks appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.88	1.97
50	*Eucalyptus camaldulensis*	29.8	19	650	1000	Good health and condition displaying a satisfactory coverage of foliage. Canopy is supported by multiple crown leaders. Major branch forks appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	7.8	3.31

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51	*Eucalyptus camaldulensis*	20.6	16	1200	1200	Fair health and condition displaying a coverage of foliage. Included union appears sound. Predominantly epicormic growth. Deadwood is considered a size and weight to represent a hazard.	Clean canopy of deadwood.	Yes	14.4	3.57
52	*Eucalyptus camaldulensis*	19.5	13.5	570	780	Fair health and condition displaying a coverage of foliage. Previous limb failure. Predominantly epicormic growth. Deadwood is considered a size and weight to represent a hazard.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.84	2.98
53	*Eucalyptus camaldulensis*	14.6	13	440	650	Fair health and condition displaying a coverage of foliage. Previous limb failure. Predominantly epicormic growth. Deadwood is considered a size and weight to represent a hazard. Basal suckers.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.28	2.76
54	*Eucalyptus camaldulensis*	21.7	16	1300	1300	Fair health and condition displaying a satisfactory coverage of foliage. Major branch attachments appear poor. Previous limb failure. Minor deadwood and epicormic growth	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	3.69

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55	*Eucalyptus camaldulensis*	18.7	8.5	420	620	Good health and good structure displaying a satisfactory coverage of foliage. Major branch forks appear sound at this time. Previous limb failure.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.04	2.71
56	*Eucalyptus rudis*	13.1	9	530	530	Fair health and condition displaying a satisfactory coverage of foliage. Major branch attachments appear sound. Previous limb failure. Minor deadwood and epicormic growth. Evidence of Psyllid pest infestation.	Selectively remove the number of limbs held over the proposed road.	Yes	6.36	2.53
57	*Eucalyptus rudis*	13.5	8	580	580	Fair health and condition displaying a satisfactory coverage of foliage. Included union and major branch attachments appear sound at this time. Previous limb failure. Minor deadwood and epicormic growth. Evidence of Psyllid pest infestation.	Selectively remove the number of limbs held over the proposed road.		6.96	2.63
58	*Eucalyptus rudis*	4.5	0	220	300	Tree is dead.	Remove dead tree.	Not suitable to be retained due to being dead.	2.64	2
59	*Eucalyptus rudis*	13.6	8	380	580	Fair health and condition displaying a reduced coverage of foliage. Canopy contains predominantly epicormic growth. Apical dieback. Deadwood held at distal sections.	Selectively remove the number of limbs held over the proposed road.	Yes	4.56	2.63

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60	*Eucalyptus rudis*	15.6	5.5	480	580	Poor health and poor structural condition displaying a reduce coverage of foliage. The canopy consists of predominantly epicormic growth. Displays basal sucker growth and previous limb failure. Phototrophic lean due to close proximity of neighbouring tree.	Remove suckers.	Yes	2.43	2.63
61	*Eucalyptus rudis*	18.5	14	700	880	Fair health and condition displaying a satisfactory coverage of foliage. Previous limb failure. Displays a secondary stem. Minor deadwood and epicormic growth throughout the canopy. Bird hollows at 2m and 4m from ground level.	Selectively remove the number of limbs held over the proposed road.	Yes	8.4	3.14
62	*Eucalyptus rudis*	20.6	8.5	990	1030	Fair health and condition displaying a satisfactory coverage of foliage supported by codominant stem. The canopy consists of predominantly epicormic growth. Major branch forks appear sound at this time. Displays a secondary stem. Minor deadwood and previous limb failures throughout the canopy. Active termites at ground level.	Selectively remove the number of limbs held over the proposed footpath.	Yes	11.88	3.35

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63	*Eucalyptus rudis*	21.6	9.5	1050	1050	Poor health and condition displaying a reduce coverage of foliage supported by multiple crown leaders. The canopy consists of predominantly epicormic growth. Major branch forks appear sound at this time. Minor deadwood and previous limb failures throughout the canopy. Displays bark wounds due to previous limb failures and beehive at 2m from ground level.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	12.6	3.38
64	*Corymbia calophylla*	18.8	13	680	680	Good health and fair structural condition displaying a full coverage of foliage supported by multiple crown leaders. Displays minor deadwood throughout the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	8.16	2.81
65	*Eucalyptus rudis*	18.6	11	1780	1780	Poor health and condition displaying a reduce coverage of foliage supported by multiple crown leaders. The canopy consists of predominantly epicormic growth. Major branch forks appear sound at this time. Minor deadwood and previous limb failures throughout the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	4.22

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66	*Corymbia calophylla*	7.5	6.5	630	630	Good health and fair structural condition displaying a full coverage of foliage supported by twin stems. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	7.56	2.73
67	*Corymbia calophylla*	7.2	0	180	250	Tree is dead.	Remove dead tree.	Not suitable to be retained due to being dead.	2.16	1.85
68	*Corymbia calophylla*	14.4	8	340	420	Good health and fair structural condition displaying a full coverage of foliage supported by codominant stems. Displays minor deadwood and kino resin.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.08	2.3
69	*Eucalyptus rudis*	11.6	9.5	410	410	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.92	2.28
70	*Corymbia calophylla*	12.1	4	230	280	Good health and fair structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.94

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71	*Eucalyptus rudis*	15.5	0	240	270	Tree is dead.	Remove dead tree.	Not suitable to be retained due to being dead.	2.88	1.91
72	*Eucalyptus rudis*	15.4	0	230	290	Tree is dead.	Remove dead tree.	Not suitable to be retained due to being dead.	2.76	1.97
73	*Eucalyptus rudis*	23.6	18	700	840	Fair health and structural condition displaying a satisfactory coverage of foliage. Major fork branch appears sound at this time. Displays minor deadwood throughout the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	8.4	3.08
74	*Eucalyptus rudis*	26.9	12	1090	1100	Fair health and condition displaying a satisfactory coverage of foliage supported by codominant stem. The canopy consists of predominantly epicormic growth. Included union appears sound at this time. Deadwood and previous limb failures throughout the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	13.08	3.44
75	*Corymbia calophylla*	8.4	4	320	330	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.84	2.08

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76	*Eucalyptus rudis*	26.1	8.5	1380	1380	Poor health and condition displaying a reduce coverage of foliage supported by multiple crown leaders. The canopy consists of predominantly epicormic growth and minor deadwood. Major branch forks appear sound at this time. Displays bark wounds due to previous limb failures. Development of basal mature sucker growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	3.79
77	*Eucalyptus rudis*	21.9	20.5	1190	1190	Fair health and condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major branch forks appear sound at this time. Displays deadwood and previous limb failures throughout the canopy. Broken branch is held within the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	14.28	3.56
78	*Corymbia calophylla*	28.5	9.5	590	820	Good health and good structure displaying a satisfactory coverage of foliage. Major branch forks appear sound at this time. Displays minor deadwood in the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	7.08	3.04
79	*Corymbia calophylla*	6.1	3.5	230	250	Good health and fair structure. Canopy is suppressed due to the dominant neighbouring tree. Codominant stem appears sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.85

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80	*Corymbia calophylla*	6.1	3	180	200	Good health and fair structure. Canopy is suppressed due to the dominant neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.16	1.68
81	*Corymbia calophylla*	20.1	9.5	400	520	Good health and fair structural condition displaying a satisfactory coverage of foliage. Minor deadwood held throughout. Major branch attachments appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.8	2.51
82	*Corymbia calophylla*	17.3	5.5	360	430	Good health and fair structure. Major branch forks appear sound at this time. Previous deadwood failure evident.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.32	2.32
83	*Corymbia calophylla*	21.7	9	550	720	Good health and fair structural condition displaying a satisfactory coverage of foliage. Minor deadwood held throughout. Major branch attachments appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.6	2.88

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84	*Corymbia calophylla*	13.5	4	230	270	Good health and fair structural condition. Displays a tall forest form with limited canopy development. Much of the lower canopy has been removed.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.91
85	*Corymbia calophylla*	8.1	3	230	260	Young tree found in good health and condition. Developing branch structure appears sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.88
86	*Corymbia calophylla*	16.3	9	590	750	Good health and fair structural condition. Previous major limb failure evident with failed limb left hanging within the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	7.08	2.93
87	*Corymbia calophylla*	12.4	5.5	330	420	Good health and fair structural condition displaying a full coverage of foliage. Codominant union appears sound.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.96	2.3
88	*Corymbia calophylla*	4	0	200	240	Tree is dead.	Remove dead tree.	Not suitable to be retained due to being dead.	2.4	1.82

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89	*Corymbia calophylla*	6.3	2	230	250	Poor health and condition displaying a reduced coverage of foliage. Canopy is suppressed and displays apical dieback with epicormic growth development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.85
90	*Corymbia calophylla*	6	1.5	150	200	Poor health and condition displaying a reduced coverage of foliage. Canopy is suppressed and displays dieback with epicormic growth development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2	1.68
91	*Corymbia calophylla*	17.7	3	300	400	Poor health and condition displaying a reduced coverage of foliage. Canopy displays dieback with epicormic growth development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.6	2.25
92	*Eucalyptus rudis*	13.7	5	610	750	Poor health and condition displaying apical dieback and major deadwood. Remaining canopy consists of epicormic limbs. Partial failure of major deadwood evident.	Remove tree based upon safety ground.	Not suitable to retain due to poor structural condition.	7.32	2.93
93	*Corymbia calophylla*	21.5	11	510	630	Fair health and condition displaying a satisfactory coverage of foliage. Major deadwood. Codominant stems display poor attachment.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located	6.12	2.73

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								within the trees SRZ.		
94	*Corymbia calophylla*	8.4	5	310	460	Leaning tree found in poor health and condition displaying previous apical limb failure and major deadwood. Remaining canopy consists of epicormic limbs. Large basal cavity.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.72	2.39
95	*Corymbia calophylla*	8.1	3	180	270	Fair health and condition. Young developing tree displays limited canopy development. Termite damage.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.16	1.91
96	*Corymbia calophylla*	8.3	3	170	260	Good health and condition. Young developing tree displays limited canopy development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.04	1.88
97	*Corymbia calophylla*	21.1	8.5	480	740	Good health and fair structural condition. Codominant stems appear sound at this time. Displays a tall forest form with limited canopy development. Much of the lower canopy has been removed.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.76	2.92

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98	*Melaleuca rhaphiophylla*	6.1	4	420	510	Fair health and condition. Codominant stem appears sound. Canopy consists of minor deadwood and epicormic growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.04	2.49
99	*Eucalyptus rudis*	5.8	3	330	390	Poor health and condition displaying previous apical limb failure and major deadwood. Remaining canopy consists of epicormic limbs.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.96	2.23
100	*Corymbia calophylla*	19.9	4	310	390	Good health and fair structural condition. Displays a tall forest form with limited canopy development. Much of the lower canopy has been removed.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.72	2.23
101	*Eucalyptus rudis*	23.9	7.5	1130	1130	Remnant tree found in poor health and structural condition. Epicormic limbs. Major and minor deadwood. Cavities located throughout the canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	13.56	3.48

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102	*Eucalyptus rudis*	6.9	2.5	230	260	Poor health and condition. Previously failed apical leader. Canopy consists of epicormic growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.88
104	*Eucalyptus rudis*	24.1	10	990	1010	Remnant tree found in poor health and structural condition. Significant termite damage located within the trunk and lower branch structure. Epicormic limbs. Major and minor deadwood. Cavities throughout the canopy with birds seen visiting. Active beehive within the upper canopy.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	11.88	3.32
105	*Corymbia calophylla*	27.9	7.5	500	650	Good health and fair structure displaying previous fire damage. Major deadwood. Codominant union appears sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6	2.76
106	*Corymbia calophylla*	27.5	5.5	510	680	Fair health and fair structure displaying a satisfactory cover of foliage. Previous fire damage. Major deadwood. Codominant union appears sound at this time. Secondary stem appears sound.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.12	2.81

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107	*Corymbia calophylla*	26.9	8	420	510	Good health and fair structure. Tall forest form with limited canopy development. Fire damage and previous lower limb removal.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.04	2.49
108	*Eucalyptus rudis*	6.3	5	250	390	Fair health and condition displaying a satisfactory coverage of foliage. Major branch forks appear sound. Canopy consists of predominantly epicormic growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3	2.23
109	*Corymbia calophylla*	24.2	6	450	550	Poor health and condition displaying a reduced coverage of foliage. Deadwood held at distal section is symptomatic of decline.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.4	2.57
110	*Corymbia calophylla*	22.5	8.5	900	900	Twin stem formation. Poor health and condition displaying a reduced coverage of foliage. Deadwood held at distal section is symptomatic of decline.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	10.8	3.17

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111	*Corymbia calophylla*	22.1	12	850	900	Poor health and condition displaying a reduced coverage of foliage. Deadwood held at distal section is symptomatic of decline. Epicormic growth. Secondary stem displays bark wound.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	10.2	3.17
112	*Corymbia calophylla*	10.1	6.5	250	290	Good health and fair structure. Epicormic growth is a result of previous limb failure. Minor deadwood.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3	1.97
113	*Eucalyptus rudis*	18.2	15.5	1230	1230	Fair health and poor structural condition. Multiple stem formation. Previous limb failure. Epicormic growth development. Major and minor deadwood is considered a hazard.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	14.76	3.61
114	*Corymbia calophylla*	25.5	11	470	590	Poor health and condition displaying a reduced coverage of foliage. Deadwood held at distal sections is symptomatic of decline. Previous limb failure.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.64	2.65

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115	*Eucalyptus rudis*	19.8	9	430	530	Poor health and condition displaying a phototrophic form with a reduced coverage of foliage. Previous limb failure and major deadwood.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.16	2.53
116	*Eucalyptus rudis, Eucalyptus wandoo*	8.5	9	650	650	Fair health and poor structural condition. Multiple stem formation. Previous limb failure. Epicormic growth development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	7.8	2.76
117	*Corymbia calophylla*	13.6	11	620	690	Poor health and fair structure. Displays a reduced coverage of foliage. Suppressed with deadwood and epicormic growth. Previous limb removal.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	7.44	2.83
118	*Corymbia calophylla*	18.3	4	230	270	Good health and fair structural condition. Tall forest form displaying limited canopy development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.76	1.91

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119	*Corymbia calophylla*	18.5	4	350	440	Good health and fair structural condition. Tall forest form displaying limited canopy development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.2	2.34
120	*Corymbia calophylla*	8.2	1.5	160	200	Suppressed and phototrophic. Found to be in good health and fair structure. Limited canopy development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2	1.68
121	*Corymbia calophylla*	5	3	190	230	Suppressed and phototrophic. Found to be in fair health and fair structure. Limited canopy development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.28	1.79
122	*Corymbia calophylla*	17.6	8	1300	1300	Good health and poor structure. Previous multiple limb failure including the apical leader. Multiple stem formation. Remaining structural limbs appear poorly attached.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	3.69

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123	*Corymbia calophylla*	16.4	4.5	300	380	Good health and fair structural condition displaying a tall forest form with limited lateral limb development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.6	2.2
124	*Corymbia calophylla*	16.2	4.5	370	490	Good health and poor structure. Suppressed canopy with limited development. Major deadwood and previous limb failure evident.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.44	2.45
125	*Corymbia calophylla*	14.3	4	450	520	Twin stem formation. Good health and poor structure. Suppressed canopy. Included narrow fork appears sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.4	2.51
126	*Eucalyptus marginata*	15.9	3	320	470	Poor health and condition displaying a reduced coverage of yellowing foliage. Suppressed canopy with limited lateral limb development.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.84	2.41
127	*Eucalyptus marginata*	5.7	2	300	300	Poor health and condition. Limited lateral limb development. Canopy is predominantly dead.	Remove tree due to poor health and condition.	Not suitable to retain due to poor structural condition.	3.6	2

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128	*Corymbia calophylla*	18.4	5	320	350	Good health and poor structure. Suppressed canopy with limited development. Major deadwood and previous limb failure evident.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.84	2.13
129	*Corymbia calophylla*	9.2	0	390	550	Tree is dead.	Remove dead tree.	Not suitable to be retained due to being dead.	4.68	2.57
130	*Eucalyptus wandoo*	12.3	6.5	260	340	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stem. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree. Basal sucker growth developing.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.12	2.1
131	*Corymbia calophylla*	13.9	5.5	280	380	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stem. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.36	2.2
132	*Corymbia calophylla*	19.3	11	360	580	Fair health and structural condition displaying a satisfactory coverage of foliage. Displays a secondary stem. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located	4.32	2.63

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								within the trees SRZ.		
133	*Corymbia calophylla*	17.7	4.5	320	420	Fair health and structural condition displaying a satisfactory coverage of foliage. Displays a secondary stem. Major branch forks appear sound at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.84	2.3
134	*Corymbia calophylla*	22.3	5.5	410	480	Fair health and structural condition displaying a satisfactory coverage of foliage. Phototrophic lean due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.92	2.43
135	*Corymbia calophylla*	8.5	2.5	220	320	Fair health and structural condition displaying a satisfactory coverage of foliage. Epicormic growth developing due to previous limb removal. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	4.64	2.05

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136	*Corymbia calophylla*	12.5	8	1450	1450	Poor health and condition displaying a reduce coverage of foliage supported by codominant stem. Included union appears sound at this time. Displays severe decline.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	15	3.87
137	*Corymbia calophylla*	8.2	2.5	190	220	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stem. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2.28	1.75
138	*Corymbia calophylla*	12.2	4	260	320	Fair health and poor condition displaying a satisfactory coverage of foliage. The canopy consists of predominantly epicormic growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	3.12	2.05
139	*Corymbia calophylla*	10.1	5	680	680	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stem. Included union appears poor at this time.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	8.16	2.81

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140	*Corymbia calophylla*	4.7	2.5	170	200	Fair health and structural condition displaying a satisfactory coverage of foliage supported by codominant stem. Included union appears sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	2	1.68
141	*Corymbia calophylla*	14.6	11.5	510	1100	Fair health and condition displaying a satisfactory coverage of foliage. Displays minor deadwood throughout the canopy. Development of mature basal sucker growth.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	6.12	3.44
142	*Corymbia calophylla*	10.6	7	700	780	Good health and fair structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Included union appears sound at this time. Epicormic growth developing due to previous limb failure.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	8.4	2.98
143	*Corymbia calophylla*	9.2	4.5	480	480	Good health and fair structural condition displaying a satisfactory coverage of foliage supported by multiple crown leaders. Major branch forks appear sound at this time. Suppressed canopy due to close proximity of neighbouring tree.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.76	2.43

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144	*Corymbia calophylla*	16.1	6.5	440	590	Good health and fair condition displaying a satisfactory coverage of foliage. Displays kino resin due to previous limb failure.	Remove tree due to being within proximity of the proposed roadway.	Not suitable for retention due to the proposed work located within the trees SRZ.	5.28	2.65
145	*Corymbia calophylla*	19.2	9	820	1350	Poor health and condition displaying a reduce coverage of foliage. Displays severe decline. Major deadwood is considered a size and weight to represent a hazard. Beehive at ground level.	Remove tree due to poor health and structural condition.	Not suitable to retain due to poor structural condition.	9.84	3.75
146	*Corymbia calophylla*	6.5	2.5	390	440	Fair health and poor condition displaying a satisfactory coverage of foliage. Apical leader is missing due to previous major limb removal. The canopy consists of mature epicormic growth due to previous limb failure.	Remove tree due to poor structural condition.	Not suitable to retain due to poor structural condition.	4.68	2.34
147	*Corymbia calophylla*	7.6	4	320	390	Good health and fair structural condition displaying a satisfactory coverage of foliage supported by codominant stems. Included union appears sound at this time. Epicormic growth developing due to previous major limb removal. Suppressed canopy and phototrophic lean due to close proximity of neighbouring tree.	Selectively remove the number of limbs held over the proposed road.	Yes	3.84	2.23
148	*Corymbia calophylla*	16.6	6.5	450	500	Good health and fair condition displaying a satisfactory coverage of	Selectively remove the number of limbs held	Yes	5.4	2.47

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						foliage. Major branch forks appear sound at this time.	over the proposed road.			
149	*Corymbia calophylla*	18.7	13	960	1250	Fair health and condition displaying a satisfactory coverage of foliage. Displays previous limb failures throughout the canopy. The deadwood is considered a size and weight to represent a hazard. Development of basal sucker growth.	Remove basal suckers and reduce deadwood.	Yes	11.52	3.63
150	*Corymbia calophylla*	15.6	14	580	950	Poor health and condition displaying a reduce coverage of foliage. The canopy consists of predominantly epicormic growth. Major deadwood is considered a size and weight to represent a hazard. Development of basal mature sucker growth.	Selectively remove the number of limbs held over the proposed road, reduce deadwood and basal suckers.	Yes	6.96	3.24
151	*Corymbia calophylla*	9.7	4.5	390	450	Fair health and condition displaying a satisfactory coverage of foliage. Displays kino resin due to previous major limb removal.	Selectively remove the number of limbs held over the proposed road.	Yes	4.68	2.37

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Summary

This consultant confirms that the 150 trees located within the section of Forrest Road, Armadale were found to be in predominately fair health and fair to poor structural condition at the time of inspection.

Out of the 150 trees audited 28 trees were found suitable to retain due to the construction works being outside the SRZ radius and canopy structure being acceptable to extend over the proposed roadway after some minor remedial works.

The audit of the 150 trees revealed that the trees have had little intervention in previous years. Due to the roadway widening 27 of the trees will require remedial pruning consisting of predominately deadwood removal and removal of low limbs that will be held low over the proposed roadway.

Several dead trees and small trees with a diameter less than 150mm in diameter were not included within this report. If they are found to be located within the designated work zone these select few will require removal.

Some of the larger and older *Eucalyptus rudis* were found to contain active bees and displayed cavities that are suitable for bird nesting. The majority of the hollows were found to be within the lower canopy. The species which contained the hollows are not regarded as favourable for Black Cockatoo nesting.

It was bought to this consultant's attention that recent work has taken place within the structural root zones of several trees located adjacent to the property boundary of Dale Christian School. The work consisted of the erection of a boundary fence with the footing having been dug with a motorised post hole digger. Some visible damage to roots on the southern side of these trees was evident and the extent of the damage is currently unknown.

Further upgrades within this section of trees assessed include the installation of concrete footpath close to the base of trees. It is recommended that all paths be installed above the natural grade level therefore reducing the impact to tree roots. Tree roots are generally found within the top 600mm of soil and excavations to install base layers and foundations can sever structural roots which can severely affect the health of the trees and potentially destabilise a tree.

The proposed plans for the site may include the removal of existing services (if any) and the possible installation of new service pipes. When services are being removed within the Tree protection zone radius of trees, it is recommended that work be done by hand or mini excavator to minimise the impact to tree roots. It is recommended that a project arborist be onsite to oversee the excavation works within the TPZ radius to document what roots are found over 30mm and provide further advice on the day if required.

When installing new services within tree protection zones, it is recommended that under boring to a depth of 1.5m – 2m is the preferred method of installing pipes and services near mature trees. This minimises disturbance to trees root systems as under boring will avoid damage to trees major structural and nutrient feeder root systems.

The trees located within the section of Forrest Road display varying soil levels. The proposed planned upgrade of the road may possibly require changes of soil level around the base of trees. Changing levels around the trees, either up or down can have a detrimental effect on the trees root systems sometimes starving the roots of oxygen & water infiltration or causing

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instability to the tree. When plans are finalised, if level changes are proposed within tree protection zones it is recommended that the project arborist be informed to inspect the amount of level change around a tree in order to make an informed decision as to whether the tree can be retained.

The TPZ and SRZ radius details for each tree are provided in the report. It is recommended that any works proposed around these trees are to be made in accordance using the Australian Standard 4970-2009 Protection of trees on development sites. This Standard is to be used as a guide to assist with the care and protection of trees. This consultant advises that the AS 4970-2009 cannot always be achieved however further investigations of select trees may be required at ground level by way of hand digging to assess visible surface roots to accomplish new works and projects which may be proposed in close proximity to trees.

Species List

The following seven species were identified by this consultant within the site:

Botanical name	**Common name**
Corymbia calophylla	Marri
Eucalyptus botryoides	Swamp Mahogany
Eucalyptus camaldulensis	River Red Gum
Eucalyptus marginata	Jarrah
Eucalyptus rudis	Flooded Gum
Eucalyptus wandoo	Wandoo
Melaleuca rhaphiophylla	Swamp Paperbark

To Summarise, the survey revealed:

- The 150 trees inspected were found to be predominantly in fair health and fair to poor structural condition at this time.
- 28 trees were found to be suitable for retention.
- 122 trees are recommended for removal which consist of, 110 are recommended to be removed due to being located within the construction area required for the road widening or the proposed work will be significantly encroaching into the trees Structural Root Zone radius (SRZ). 6 trees are recommended to be removed as they were found to be dead. 6 trees are recommended for removal based upon the current poor health and poor structural condition. These recommendations are based upon safety grounds.
- 27 trees are recommended for some remedial pruning works predominately consisting of the removal of dead wood and the removal of limbs which have the propensity to obstruct the proposed installation of this section of roadway.

Pruning is to be carried out by a qualified Arborist in a manner consistent with AS 4373-2007 *Pruning of Amenity Trees.*

A works list in excel spreadsheet format accompanies this report.

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Contractor Specification

To reduce the effects that a development can have upon the health of retained trees, suitable forms of protection are required together with the steps necessary to limit deterioration of those trees left standing on the development site.

This consultant confirms that there is clear evidence that mature trees are more sensitive to contractor pressure than young and semi-mature specimens, where the younger trees are able to compensate and adapt to new ground conditions by producing new roots. However, although younger trees can exhibit a remarkable tolerance to the adverse effects of building operations and site alterations, this is conditional upon the location and extent of works carried out within the root zone of the tree and therefore the extent of primary root removal.

Trees store vast amounts of carbohydrate in their root system, subsequently when major roots are severed the tree is unable to replenish its depleted energy levels, which gradually results in the decline of the canopy and often the death of the tree, with such symptoms often not evident until some years later.

Therefore, there must be clear recommendations to alleviate detrimental tree damage from the commencement through to the completion of the development, with the recommendations enforced and clearly understood by all contractor staff.

- All trees identified for retention shall be clearly marked and a **Tree Protection Zone (TPZ)** confirmed prior to the commencement of the development. The tree protection zone is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, to ensure the tree remains viable. To determine the radius of the TPZ for each tree, the DBH is multiplied x 12. DBH is the trunk diameter 1.4m above ground level. The radius is measured from the centre of the stem at ground level. E.g. a tree's trunk diameter is 0.3m x 12 = 3.6m, meaning that a 3.6m radius around the tree is the recommended TPZ. As confirmed in the AS 4970-2009 a TPZ should not be less than 2m nor greater than 15m (unless crown protection is required).

- This consultant advises that a **structural root zone** area of a tree is required for tree stability. Using Australian Standards AS 4970-2009 *Protection of trees on development sites* the structural root zone area can be calculated when major encroachment into a TPZ is proposed. This zone considers a tree's structural stability only and not the root zone required for a tree's health and long-term viability, which is usually a much larger area.

- No building materials are to be stored or disposed of within the tree protection zone, with provisions implemented so that building chemicals do not come into contact with the root rhizosphere or the roots themselves.

- Excavated soil shall not be stored or built up around the trunk of retained trees. **Soil levels shall not be changed around the base of trees, either raised or lowered.**

- No filling, trenching or other earthworks shall be carried out closer than the determined structural root zone of the individual tree without written Arborist approval.

- If a bob cat is to be used it is to be driving in a forward and backwards motion within the trees TPZ and no turning or squirreling is to be carried out within the TPZ radius. This is to ensure that the soil is not dug into when turning which will rip and tear surface roots.

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- It is a requirement that the mini excavator have a flat edge bucket and is used to reduce the weight and compaction of soil around the tree protection and root zones.

- If soil is to be lowered or grass layer removed a spotter will be required to watch all works and it is preferable to use a mini excavator (Not a bobcat) when carrying out this work. The mini excavator is to lightly scrape the top layer off not gouge deep sections of soil. All works are to be supervised by a spotter for root damage when working in the TPZ radius.

- Approved excavations within the structural root zone shall be undertaken under supervision with the exposed roots having a diameter less than 25mm diameter cleanly severed to initiate occlusion. **Roots above 30mm diameter are not to be cut without authorisation from a qualified Arborist.**

- Any remedial works which requires the removal of lower limbs to facilitate access by large machinery or to alleviate the level of risk to the contract staff shall be carried out by a competent Arborist to the relevant Australian Standards AS 4373-2007 *Pruning of amenity trees.*

- If trees are growing close together any felling and root removal shall be done with care to avoid damage to the retained trees.

- Under boring to a depth of 1.5m – 2m is the preferred method of installing pipes and services near mature trees. This minimises disturbance to trees root systems as the top 1.5m – 2m of soil is where the trees major structural and nutrient feeder root systems are located and this will ensure the future health and condition of the tree is maintained.

- Where the extent of construction works has resulted in a nominated tree becoming structurally unstable or within a location to render the tree a high level of risk to property and persons, the contractor shall inform the works supervisor for further instructions.

- Any damage to the protected tree during the preliminary stages of site clearance or during the construction works shall be reported immediately to the site supervisor with remedial works carried out by a qualified Arborist to the relevant Australian Standard.

- Supplementary watering to retained trees may be required over summer months where works are in proximity of the trees. Watering the trees is required to minimise stress on the trees while works are occurring. It is recommended to water deeply a minimum of once per week for a total of 1000 litres per tree for mature trees and 600 litres for trees less than 8m in height. It is recommended that the water truck have a wetting agent in the tank to assist to get the water through to sandy layer to the trees root system.

- Established trees of good vigour and structure represent an asset to any development site. Trees are living organisms that require certain environmental conditions in order to maintain their value as an asset. Damage must be avoided or minimized during the development process and procedures to ensure the protection of trees must be in place at all stages.

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Zana Sheary and Sarah Taylor- Arboricultural Consultants
Paperbark Technologies Pty Ltd
PO Box 1116
Scarborough WA 6922
Mob: 0401 817 551
zana@paperbarktechnologies.com.au
sarah@paperbarktechnologies.com.au
www.paperbarktechnologies.com.au
ISA Certified Arborist AU-0341A
Quantified Tree Risk Assessor Lic-3442/4098
Diploma of Horticulture/Arboriculture

Limitation of liability
Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk.
This report only covers identifiable defects present at the time of inspection. Paperbark Technologies accepts no responsibility and cannot be held liable for any structural defect or unforeseen event/situation or adverse weather conditions that may occur after the time of inspection.
Paperbark Technologies cannot guarantee that the tree/s contained within this report will be structurally sound under all circumstances, and is not able to detect every condition that may possibly lead to the structural failure of a tree. Paperbark Technologies cannot guarantee that the recommendations made will categorically result in the tree being made safe.
Unless specifically mentioned this report will only be concerned with above ground inspections, as such all observations have been visually assessed from ground level. Trees are living organisms and as such cannot be classified as safe under any circumstances. Trees fail in ways that the arboriculture industry does not fully understand.
The recommendations are made on the basis of what can be reasonably identified at the time of inspection therefore Paperbark Technologies accepts no liability for any recommendations made.
All care has been taken to obtain information from reliable sources, however Paperbark Technologies can neither guarantee nor be responsible for the accuracy of information provided by others.
In the event that re-inspection of the tree/s is recommended it is the client's responsibility to make arrangements with Paperbark Technologies.

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Australian Standard 4970-2009 *Protection of trees on development sites.*

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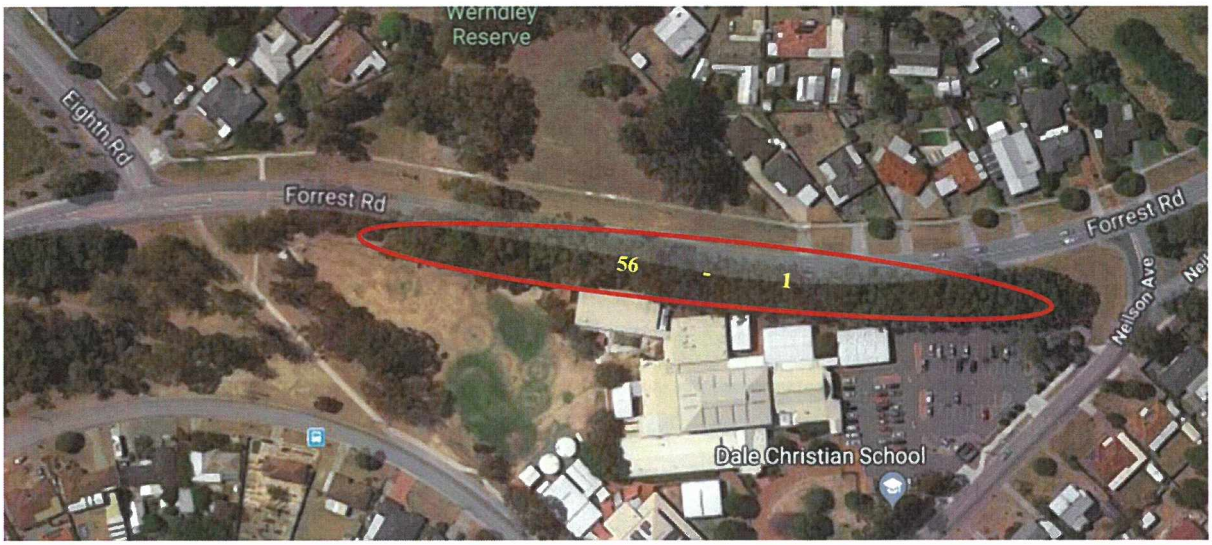
Eastern side of the Forrest Road site indicating trees Surveyed (Trees are tagged)



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Western side of the Forrest Road site indicating trees Surveyed (Trees are tagged)

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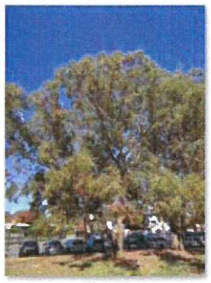
Tree Photos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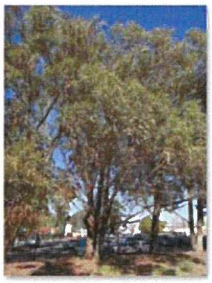
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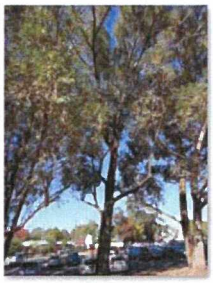
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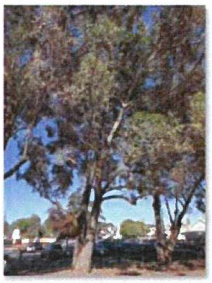
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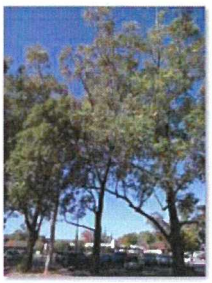
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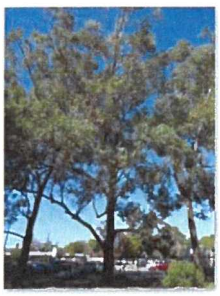

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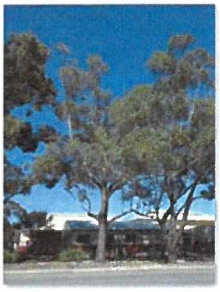

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Tree 16

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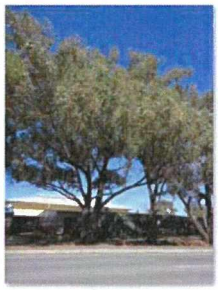

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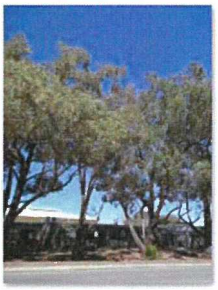

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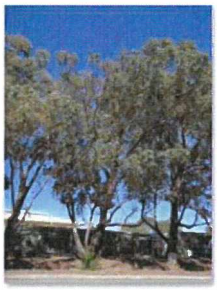

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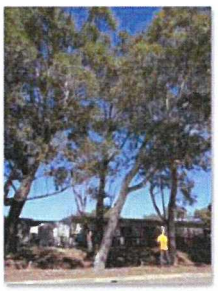

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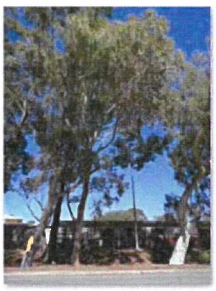

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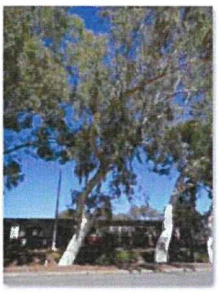

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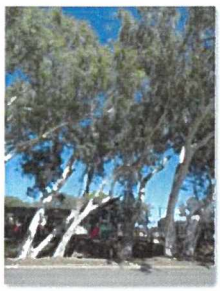

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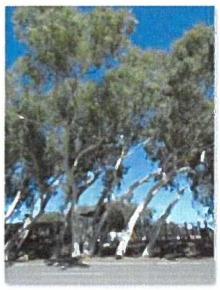

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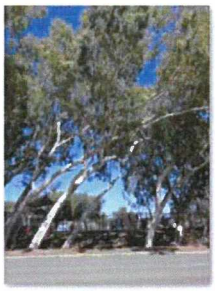

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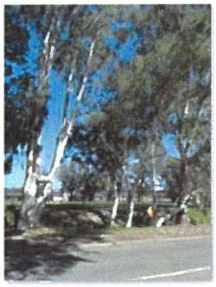

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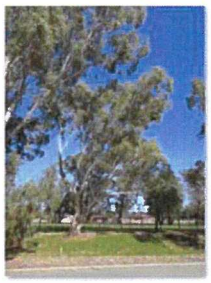

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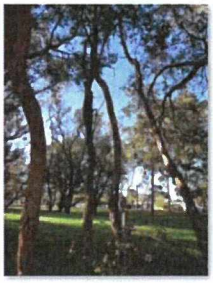

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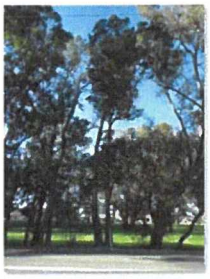

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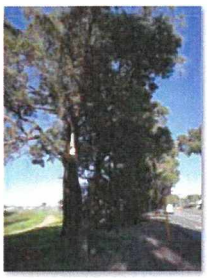
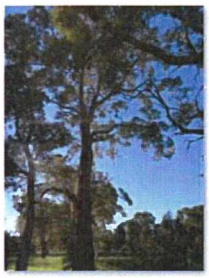
Tree 146



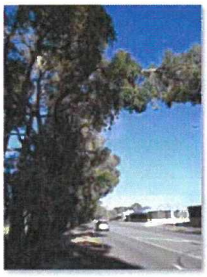
Tree 147

Tree 148



Tree 149

Tree 150



Tree 151

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